

MONTHLY WEATHER REVIEW,

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(General Weather Service of the United States.)

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION:

In preparing this REVIEW the following data, received up to October 20th, have been used, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at 131 Signal Service stations and 15 Canadian stations, as telegraphed to this office; 195 monthly journals and 166 monthly means from the former, and 15 monthly means from the latter; 216 monthly registers from Voluntary Observers; 56 monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; monthly reports from the local Weather Services of Iowa, Nebraska and Missouri, and of the Central Pacific Railway Co.; reliable newspaper extracts; special reports.

BAROMETRIC PRESSURE.

The distribution of mean atmospheric pressure over the United States and Canada for the month of September, 1881, is shown by isobaric lines (in black) upon chart No. II. The area of lowest pressure covers the northern portions of the Upper Mississippi and Missouri valleys, in which regions the greatest departures from the normal for the month occur; within this territory the pressure ranges from 29.87 to 29.93. An area of 29.90 prevails over California, mean pressure ranging from 29.84 to 29.92. The area of highest mean pressure embraces the central and western portions of the South Atlantic states, extending thence northeastward along the Middle Atlantic, New England and Nova Scotia coasts; barometer ranging from 30.08 to 30.16. Compared with the preceding month the pressure is everywhere higher, by from 0.02 to 0.15 inch, except in the Upper Mississippi and Missouri valleys, and in California, where the fall is from 0.01 to 0.10 inch.

Departures from the Normal Values for the Month.—Compared with the means for previous years the mean pressure of the present month is everywhere below the normal, from 0.01 to 0.18 inch, except at scattering stations along the Atlantic coast where the excess ranges from 0.01 to 0.09 inch. The regions of greatest deficiency are found in the Upper Mississippi and Missouri valleys and in the Southern Pacific coast region. Stations reporting a normal condition are as follows: Key West, Baltimore, Philadelphia, Washington and Knoxville; those reporting a departure of but 0.01 inch: Charleston, Norfolk, Montgomery, Wilmington, Savannah, Augusta, Atlanta, Cincinnati, Buffalo, Detroit, Galveston, Shreveport, Red Bluff and Pioche.

Barometric Ranges.—The range of pressure for the month has generally varied from 0.5 to 0.7 inch, and in the extremes from 0.23 inch at Key West to 1.03 and 1.09 inches at Wilmington and Smithville respectively. Throughout the several districts the monthly barometric range varied as follows: New England, 0.52 inch on summit of Mt. Washington to 0.84 inch at Eastport; Middle Atlantic states, 0.39 at Cape May to 0.6 at Albany; South Atlantic states, 0.34 at Cedar Keys to 1.03 at Wilmington and 1.09 at Smithville; Eastern Gulf states, 0.23 at Key West to 0.56 at Montgomery; Western Gulf states, 0.39 at Indianola to 0.55 at Mason; Rio Grande valley, 0.36 at Brownsville to 0.45 at Brackettville; Ohio valley and Tennessee, 0.37 at Pittsburg to 0.84 at Indianapolis; Lower Lake region, 0.44 at Oswego to 0.63 at Toledo; Upper Lake region, 0.55 at Port Huron to 0.9 at Marquette and 1.05 at Duluth; extreme Northwest,

0.85 at Bismarck to 1.00 at St. Vincent; Upper Mississippi valley, 0.57 at Keokuk to 0.95 at St. Paul; Missouri valley, 0.63 at Leavenworth to 0.91 at Yankton and 0.92 at Huron, Dak.; Northern Slope, 0.66 at Cheyenne to 0.84 at Ft. Keogh; Middle Slope, 0.52 at Ft. Elliott to 0.75 at Dodge City; Southern Slope, 0.48 at Jacksboro to 0.66 at Ft. Griffin; Northern Plateau, 0.56 at Dayton to 0.74 at Missoula; Middle Plateau, 0.51 at Winnemucca to 0.58 at Salt Lake City. Southern Plateau, 0.4 at Silver City to 0.63 at Phoenix; North Pacific coast, 0.47 at Roseburg to 0.64 at Olympia; Middle Pacific coast, 0.47 at Red Bluff to 0.55 at Sacramento; Southern Pacific coast, 0.26 at Campo to 0.51 at Yuma.

Areas of High Barometer.—There was a general deficiency in pressure for the month, the most marked being in the Northwest. This distribution of pressure was associated with the southerly winds which prevailed for the month and with the unusually high temperature, which will hereafter be more fully described. Only four areas of high barometer were sufficiently marked to merit description.

No. I.—On the 4th, although the pressure continued below the mean there was a general rise of barometer in the Atlantic and Gulf states. The rise on the 5th, was confined to the South Atlantic and Gulf coast. On the 6th and 7th, the pressure was, in general, above the mean east of the Rocky Mountains. On the 8th, the region of high barometer was transferred to north-western Texas and New Mexico. During the regime of this high pressure fair weather prevailed in the Middle, South Atlantic and East Gulf states and in Tennessee and the Ohio valley.

No. II.—On the 13th, there was a marked rise in pressure on the Pacific Slope which, on the 14th, extended over Idaho, Montana and Dakota; the barometer in Montana averaging 0.3 inches above the mean for the month. On the 15th, this area remained nearly stationary in position while low area No. IV was moving up the Mississippi valley. On the 16th, it disappeared before the advance of this storm into Minnesota.

No. III.—During the progress of low area No. IV, there was, on the 14th and 15th, a marked barometric rise in the Maritime Provinces of Canada and in New England. The pressure remained high until the 18th, and with slight change of location. The highest barometers reported were at the morning report of the 16th, Chatham, 30.60, or one-half inch above the normal; Sydney, 30.57; Halifax, 30.56; Eastport, 30.54. On the 15th and 16th, the pressure in this region averaged more than 0.4 inches above the mean for the month.

No. IV.—On the 27th, the barometer rose above the mean in the Missouri valley. On the 28th, the rise extended eastward to the St. Lawrence valley. On the 29th, during the passage of low area No. VII over the Northwest, the pressure rose in New England and Nova Scotia, the highest barometers being Eastport, 30.40; Halifax, 30.47, and Sydney, 30.46. On the 30th, with diminishing pressure, the centre of the high area was transferred to Virginia and North Carolina, while low area No. VII moved towards Hudson's Bay.

Areas of Low Barometer.—Seven such areas have been charted. The month is remarkable for the few storms of any energy which have affected the Atlantic coast of the United States. In the Lake region two storms (low areas Nos. II and VII) exhibited great energy. Low area No. VI is remarkable for the anomalous track pursued at different parts of its course.

No. I.—On the 4th, a great depression which had developed east of the Rocky Mountains moved over the Northwest. The lowest barometers reported were Yankton and Ft. Bennett, 29.43 or 0.6 inch below the mean, Duluth, 29.28 or 0.71 inch below the mean. On the 5th, the storm centre pursued an easterly track north of the Lake region, and on the 6th disappeared beyond the Gulf of St. Lawrence. During the passage of the depression no rain fell in front or south of the storm centre, but general precipitation was reported in the Northwest and Upper Lakes, after which the warm southerly winds veered to colder northwesterly. The maximum temperatures of the month, east of the Rocky Mountains, are associated with the march of this low area. The highest reported temperature was in Washington City, 104°. Cautionary signals were displayed in advance of this storm on the 4th on Lakes Superior, Michigan and Huron. The following maximum velocities were reported: Milwaukee, 30 S.; Grand Haven, 54 SW.; Port Huron, 25 W.

No. II.—On the 8th a depression moved to the eastward over Idaho and Montana, and on the 9th advanced beyond Dakota into Minnesota. On the 10th the storm centre passed over Lake Superior and into the Province of Ontario. On the 11th the low area moved beyond the Gulf of St. Lawrence. During the march of the storm centre there were no specially low barometric readings, nor was the barometric gradient at any time especially noteworthy, but the passage of the centre of low area was marked by very sharp falls of pressure followed at the subsequent observation by sharp rises. These sudden changes were accompanied by remarkably high winds for the Lake region. Cautionary signals were ordered to be displayed on the 10th for all the Lakes. They were generally justified by the following maximum velocities: Marquette, 35 W.; Escanaba, 25 SW.; Milwaukee, 38 SW.; Chicago, 25 W.; Grand Haven, 44 W.; Alpena, 26 W.; Port Huron, 27 W.; Toledo, 30 SW.; Sandusky, 44 W.; Erie, 27 W.; Buffalo, 28 SW. The precipitation of this storm was confined to the Northwest, Lake region and New England.

No. III.—At the morning report of the 9th a sharp fall in pressure and the circulation of the winds showed the existence of a storm centre menacing the North Carolina coast; during the

day a depression of great energy but of very slight diameter moved in a northerly track toward Norfolk. On the 10th, curving slightly to the northeast the storm passed beyond the coast. Cautionary signals were ordered in advance of this storm on the 9th from Smithville to Sandy Hook, and were justified by the following maximum velocities: Smithville, 60 NE.; Wilmington, 64 W.; Macon, 50 SW.; Hatteras, 42 SW.; Kittyhawk, 40 S.; Cape Henry, 35 SE.; Norfolk, 25 SE.; Chincoteague, 32 SE.; Barnegat, 28 N.; Sandy Hook, 30 NE.

No. IV.—This storm, which pursued a very anomalous track, was first evident in Texas, where on the 14th it moved in a track nearly due east. At the midnight observation, while the storm centre was near New Orleans, a barometric depression extended from the Gulf of Mexico to the Lake Superior region. At the same time the high pressure No. III, before described, prevailed with fair weather in New England. These conditions were unfavorable to an eastern progress of the storm, and on the 15th the depression moved in a northerly course to Lake Michigan. At the end of this day the pressure had not yielded in New England, and had begun to fall in the Northwest, the lowest barometers reported were, Chicago, 29.42; Grand Haven, 29.44; Milwaukee, 29.36, all more than 0.6 inch below the normal. On the 16th, with diminishing energy, the storm centre moved into Iowa and Minnesota, and on the 17th into Manitoba. The track on the 16th and 17th is very remarkable, and probably for a storm of such energy has no parallel in the history of the Signal Service. Cautionary signals were displayed on the 14th from Indianola to Pensacola, and on Lakes Michigan, Superior and Huron, and on the 15th on Lakes Erie and Ontario. The following maximum velocities were reported: Indianola, 40 N.; Galveston, 28 N.; Port Eads, 28 S.; Pensacola, 38 S.; Mobile, 28 SE.; Duluth, 78, NE.; Marquette, 30 S.; Milwaukee, 38 SW.; Grand Haven, 30 SE.; Alpena, 26 W.; Port Huron, 27 W.; Detroit, 39 SE.; Sandusky, 30 SW.; Cleveland, 26 SE.; Erie, 37 SE.; Rochester, 35 E.

No. V.—On the 23d, a depression exhibiting slight energy moved across Dakota into Minnesota. On the 24th, turning more to the north of east it moved with increased energy beyond the Lake Superior region. Nearly all the rain accompanying this storm was confined to the Northwest and the Upper Lake region. Cautionary signals were in general justified by the following maximum velocities: Duluth, 25 SW.; Marquette, 26 S.; Milwaukee, 34 SW.; Chicago, 27 SW.; Grand Haven, 33 SE.; Alpena, 36 S.; Port Huron, 27 S.; Detroit, 28 SW.; Toledo, 31 SE.; Sandusky, 32 SW.; Cleveland, 28 S.

No. VI.—On the 25th a depression developed in Wyoming and Nebraska. On the 26th, the low area, showing but slight energy, moved into Wisconsin. On the 27th it advanced to the eastward beyond the lakes and on the 28th it disappeared beyond the Gulf of St. Lawrence. At no portion of its track did it become a storm of any violence. Its passage was accompanied by light rain fall, which extended to New England.

No. VII.—On the 28th, a low area developed in Dakota, which, on the 29th, moved in a northeasterly track across Minnesota. South of the track of the centre of depression there were sharp barometric gradients and considerable storm energy. The lowest pressures reported were: Omaha, 29.42; Fort Bennett, 29.38; Moorehead, 29.4; St. Paul, 29.46; Duluth, 29.3—all more than 0.6 inch below the mean. Cautionary signals, which had been ordered for the previous storm (No. VI) were kept displayed in consequence of danger menaced by the appearance of the new storm centre.

INTERNATIONAL METEOROLOGY.

International charts, Nos. V and VI, accompany the present REVIEW. The former is published for July, 1879, and continues the series of this chart commenced in January, 1877. Chart No. VI is prepared for the month of October, 1879, and continues the series of this chart commenced in November, 1877.

Chart No. V shows the mean pressure, temperature and the prevailing direction of the wind at 7.35 a. m., Washington, or 0.43 p. m., Greenwich mean time, for the month of July, 1879, over the Northern and at certain isolated stations in the Southern Hemisphere. To the areas of low pressure for the present month there attaches considerable interest, owing to their strikingly irregular boundaries over northern Europe. It will be observed, upon examination of the chart, that the lowest mean pressures are to be found over northern Hindostan, as indicated by the isobar of 29.50. Thence northward over the Himalayas and the western portion of the Chinese Empire, the barometer rises to 29.60, and north of Toorkistan and the Province of Tomsk, comprising the valley of the Obi and its tributaries, the pressure again rises to 29.70. Northwest of this locality, and within very narrow and irregular limits, the area of 29.70 passes over central Russia, southern Scandinavia and the northern portion of the British Isles. Between the meridians of 10° E. and 10° W., two small areas of 29.60 appear, one over the Shetland Islands and the other over the Hebrides. The area of 29.70 probably reaches the Asiatic coast in the vicinity of Pekin, but from lack of reports from central and eastern Siberia the lines on the coast cannot be connected with those of the interior. In Manitoba and along the southern shores of Hudson's Bay the barometer falls to near 29.80, and in one instance to 29.78 at Pembina, Dakota. Over the United States, west of the 100th meridian, the pressure is generally above 30.00; to the eastward and north of the 40th parallel, including Texas and Indian Terri-